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CLAIMS

What is claimed is:

- 5 1. A power supply, comprising:
 - a steam engine for providing a first source of power, said steam engine also producing heat waste;
 - a thermionic device for providing a second source of power, said thermionic device providing said second source of power from said heat waste

10 10 which is provided to said thermionic device; and

 wherein said heat waste of said steam engine is in fluid communication with a heat exchanger of said thermionic device.
2. The power supply as in claim 1, wherein said steam engine
15 further comprises:
 - a combustor;
 - a first heat exchanger configured to receive a heat exhaust of said combustor, said first heat exchanger using said heat exhaust to convert a supply of water into steam,

20 20 wherein the steam generated by the steam engine is used to drive a turbine of the power supply.
3. The power supply as in claim 2, further comprising:
 - an exhaust conduit providing fluid communication between said

25 25 first heat exchanger and said heat exchanger.
4. The power supply as in claim 3, further comprising: a third heat exchanger, said third heat exchanger being configured to receive an exhaust of said heat exchanger, wherein said exhaust of said heat exchanger is used to
30 30 preheat a supply of water before it reaches said first heat exchanger.

5. The power supply as in claim 4, further comprising: a fourth heat exchanger, said fourth heat exchanger being configured to receive an exhaust of said turbine, wherein said exhaust of said turbine is used to preheat a supply of water before it reaches said second heat exchanger.
6. The power supply as in claim 5, wherein said exhaust of said turbine comprises steam.
- 10 7. The power supply as in claim 6, further comprising:
a water condenser configured to receive an exhaust of said fourth heat exchanger and said water condenser supplies condensed water from said exhaust of said fourth heat exchanger into a tank; and
a pump configured to pump water from said tank into said fourth heat exchanger, said third heat exchanger and said first heat exchanger.
- 15 8. The power supply as in claim 7, wherein said first heat exchanger, said third heat exchanger and said fourth heat exchanger are connected in series for providing said supply of water.
- 20 9. The power supply as in claim 8, further comprising:
a temperature sensor for providing a signal indicative of the temperature of the water being supplied to said tank; and
a controller configured to receive said signal as well as other signals indicative of the operational status of components of the power supply, wherein said controller provides a plurality of output signals for controlling the operational status of components of the power supply.
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10. The power supply as in claim 1, wherein said heat waste is generated by said steam engine before, during, and after said steam engine is providing said first source of power.

5 11. The power supply as in claim 3, wherein said second heat exchanger is configured to provide heat to a cathode of said thermionic device.

12. The power supply as in claim 11, wherein said cathode is located in a housing of said thermionic device and said cathode is separated from an 10 anode of said thermionic device, wherein said heat provided to said cathode causes electrons to separate from said cathode.

13. The power supply as in claim 12, wherein a vacuum is disposed between said anode and said cathode.

15 14. The power supply as in claim 11, wherein said thermionic device is configured to provide power when a heat source of approximately 1000 degrees Celsius is provided to said cathode.

20 15. The power supply as in claim 14, wherein said power supply is configured for use in stationary power plant.

16. The power supply as in claim 14, wherein said power supply is an auxiliary power unit configured for use in a vehicle.

25 17. The power supply as in claim 14, further comprising a power conditioner for receiving and conditioning power generated by said steam engine and said thermionic device.

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18. The power supply as in claim 1, wherein a plurality of steam engines provide heat waste to a plurality of thermionic devices.

19. The power supply as in claim 1, further comprising another heat 5 exchanger, said another heat exchanger providing an inlet and an exhaust of a cooling medium to an anode of said thermionic device, wherein unheated air is supplied to said inlet and air heated by said anode is supplied to said exhaust, said anode being maintained at a temperature differential between a cathode of said thermionic device.

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20. The power supply as in claim 19, wherein said another heat exchanger also provides an exhaust to an inlet conduit of said steam engine.

21. The power supply as in claim 1, where said heat waste of said 15 steam engine is within a range defined by a lower limit of 500 degrees Celsius and an upper limit of 1,400 degrees Celsius when said steam engine is providing said first source of power.

22. A power supply, comprising:
20 a steam engine for providing a first source of power, said steam engine producing heat waste when said steam engine is providing said first source of power, said steam engine comprising:
a combustor for providing a source of heat to a first heat exchanger of said steam engine; and
25 an exhaust conduit providing fluid communication between an exhaust of said first heat exchanger and to a second heat exchanger, said second heat exchanger being configured to provide heat to a thermionic device, said thermionic device providing a second source of power from said second heat exchanger.

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23. The power supply as in claim 22, where said heat waste of said steam engine is within a range defined by a lower limit of 500 degrees Celsius and an upper limit of 1,400 degrees Celsius when said steam engine is providing said first source of power.

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24. The power supply as in claim 22, further comprising another heat exchanger, said another heat exchanger providing an inlet and an exhaust of air to an anode of said thermionic device, wherein unheated air is supplied to said inlet and air heated by said anode is supplied to said exhaust, wherein said 10 anode is maintained at a temperature differential between a cathode of said thermionic device.

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25. The power supply as in claim 22, wherein said thermionic device provides an initial source of power during a warm up phase of said steam engine.

26. A method for generating power, comprising:
generating power from a steam engine, said steam engine
generating heat exhaust from a first heat exchanger, said first heat exchanger
20 receiving heat from a combustor to heat water into steam to drive a steam
turbine; and
generating power from a thermionic device, said thermionic
device generating power from said heat exhaust received from said first
combustor, wherein said heat exhaust is routed to said thermionic device after
25 heating water supplied to said first heat exchanger and said thermionic device
generates power without increasing the amount of fuel necessary to heat the
water into steam to drive said steam turbine.